REMARKS/ARGUMENTS

The present application contains claims 1-27. Claim 27 has been amended in a manner proposed by the examiner. Claims 1-7, 11-13, 15-19 and 23-25 have been amended to change "means plus function" terms to structure. No new matter has been added.

Claims 8-10, 14, 20, 21, 22 and 26 have been withdrawn as being directed to a non-elected invention.

It is noted that: the drawings filed August 22, 2003 have been accepted; the foreign priority claim has been acknowledged and the certified copies of the priority documents have been received.

Restriction/Election

Making reference to the Detailed Action, it is noted that the restriction requirement has been made final and that claims 1-7, 11-13, 15-19, 23-25 and 27 have been examined on the merits.

Allowable Subject Matter

The Examiner is thanked for indicating that claims 11-13 and 23-25 will be allowed if rewritten to include the limitations of their main claim and any intervening claims.

Claim Rejections - 35 U.S.C. §101

Claim 27 was rejected in the Action based on 35 U.S.C. §101. Claim 27 has been amended to incorporate the Examiner's proposed language and it is submitted that the rejection of claim 27 should be withdrawn.

Claim Rejections - 35 U.S.C. §103

Claims 1, 2, 5-6, 17, 18 and 27 have been rejected under 35 U.S.C. §103(a) as obvious over Curtis et al. (U.S. Patent No. 5,661,521) (hereinafter, "Curtis et al.") in view of Kyoji Tamura (U.S. Patent No. 5,999,215) (hereinafter, "Tamura"). This rejection is respectfully traversed.

Although Curtis et al. inferentially teaches an image pickup system, describing the image data in 10 as providing "digitized data, typically from a CCD imager" (See column 4, lines 12-14, as well as Fig. 3) showing a single horizontal line of pixels 110 and a shift register 114 and Fig. 4 showing a plurality of horizontal lines of pixels, there are nevertheless some significant and patentable distinctions as between Curtis et al. and the present invention, which include the following:

The Examiner refers to column 2, line 62 of Curtis et al. as teaching smear estimation means. It should be noted that the smear scaling factor stored in a storage unit 100 shown in Fig. 1 is obtained by taking measurements to obtain a smear scaling factor described in the text at column 5, line 25 through column 6, line 54. Both the embodiment shown in Fig. 1 as well as the embodiment found in Fig. 5 of Curtis et al. stores the smear scaling factor **independently** of the image data provided at input 10 in both Fig. 1 and Fig. 5. The image data inputted at 10 in Fig. 1 of Curtis et al. is **not** utilized to provide the noise estimates.

In addition, it should be noted that the dark correction value stored at 30 in Fig. 1 and the gain correction value stored at 60 in Fig. 1 are likewise determined **totally independently** of the image data inputted and are calculated **prior** to the

image presented at input 10 of Fig. 1. Note, for example, column 4, lines 40-43 of Curtis et al., which recite that the dark and gain corrections "are determined during calibration periods."

In addition to the above, the correction values and scaling factor employed in Curtis et al. require light shield pixels described as pixels that are "completely masked so as not to receive light" (See column 2, line 4-6 of Curtis et al., as well as Figs. 3 and 4 which show the first eight (8) and last eight (8) pixels of each horizontal line as being light shield pixels). In the present invention, the noise estimating unit 17 shown, for example, in Figs. 1 and 5, while employing independent variables such as temperature, gain and signal value level L, neither requires nor uses signals from the light shielded pixels. The present invention also discusses use of the effect of exposure time on random noise, describing a coefficient d(S) as being obtained by measuring characteristics of the image pickup element system before-hand together with the values a, b, c which are described as being functions of exposure time and gain and which are recorded in the ROM 47 and thus need not always be determined for each shooting operation. Nevertheless, there is no use or requirement in the present application for deriving any data from light shielded pixels as is required in Curtis et al.

The Examiner admits that Curtis et al. ***does not*** disclose shooting condition estimating means for estimating a shooting condition when an image based on said signal is acquired; and correction means for correcting the amount of noise estimated by the noise estimating means based on the shooting condition estimated by the shooting condition estimated means and relies upon Tamura for teaching this capability. The Examiner states that Tamura teaches a portrait mode shown in Fig. 3, a sport mode shown in Fig. 4 and a landscape mode shown in Fig. 5 of

Tamura, stating that this is the same as estimating the shooting condition and further stating that "a high quality photograph can be obtained after smear correction based on the shooting condition," and that it would have been obvious to one having ordinary skill in the art at the time of the invention to implement the Tamura teaching into the Curtis et al. system "for noise correction and noise reduction based on shooting conditions because a high quality photograph can be obtained after smear correction based on shooting conditions."

It is our opinion that this argument is not valid for the following reasons.

First of all, Tamura **does not** teach a shooting conditions estimating unit, but teaches a detection means, shown in Fig. 2 of Tamura, for detecting a state of the iris. Note, for example, column 7, lines 11-39 of Tamura which describes that the different shooting modes shown in Figs. 3, 4 and 5 cause the movable or variable range of the iris in one mode to differ from that of the iris in the other modes even when the object remains unchanged, which greatly effects the focus control and white balance control wherein the iris encoder element 4 detects the aperture value of the iris at data correction part 19g of Fig. 2 which is then utilized to adjust the white balance control part 19a and the focus control part 19c.

In the present application, the shooting conditions estimating unit utilizes information in circuit 31 of the shooting conditions estimating circuit 16 shown in Fig. 3, wherein of one of a scenery shot, portrait shot or close up shot provides a gain needed for correction at circuit 34 of unit 16 and provides this to a correction unit 18. To the contrary, Tamura exerts control over the electronic shutter and iris by circuit parts 19e and 19f shown in Fig. 2 as well as exerting white balance control at 13a and 13b shown in Fig. 2, based on detection of the decoder 4 which

provides an input to data correction part 19g, which in turn provides correction data to focus part 19c and white balance control part 19a. There is **no** teaching of applying a shooting conditions estimating unit output to a correction unit 18 which then provides a signal to a noise reducing unit 19. There is no teaching or even suggestion in Tamura of providing a shooting conditions estimating unit (Note that there is no estimation of shooting conditions but an actual reading of a position of the iris) and then providing an amount of noise at function calculating unit 48, shown in Fig. 5 of the present application, to a correction unit 18 which then provides an output to a noise reducing unit. There is no suggestion in either Curtis et al. or Tamura, taken alone or in combination, as to how the teachings of these two (2) references may be combined to achieve the combination set forth, for example, in claim 1 of the present application.

Summarizing, the Examiner acknowledges at page 4, lines 11-15 of the Office Action that Curtis et al. does not disclose "shooting condition estimating means for estimating a shooting condition when an image based on said signal is acquired" and "correction means for correcting the amount of noise estimated by the noise estimating means based on the shooting condition estimated by the shooting condition estimating means" which are features recited in claim 1.

The Examiner asserts at page 4, line 16 to page 5, line 1 of the Office Action that "Tamura discloses in Figs. 3, 4 and 5, so called program diagrams showing the states of setting exposure control parameters respectively in the program modes for different presumed shooting conditions, and that Figs. 3, 4 and 5 show a portrait mode, sport mode, and landscape mode, respectively, which is the same as estimating the shooting condition."

However, column 5, lines 18-31 of Tamura states that a program mode for a shooting condition is "arbitrarily selected" according to the intention of the camera operator. This is not "estimating a shooting condition" which is recited in the present claim 1. Therefore, the argument "Figs. 3, 4 and 5 show a portrait mode, sport mode, and landscape mode, respectively, which is the same as estimating the shooting condition" is not reasonable.

The Examiner further asserts at page 5, lines 1 and 2 of the Office Action that "a high quality photograph can be obtained after smear correction based shooting condition." However, a skilled person in the art at the time of the invention cannot easily conceive the concept of "smear correction based shooting condition" based on the combination of Curtis et al. and Tamura.

As the Examiner stated at page 4, lines 2-10 of the Office Action, Curtis et al. admittedly discloses the feature of "correcting the amount of noise estimated." However, as shown in claims 2, 3 and column 7, lines 11-39, Tamura merely discloses the feature that "aperture value information is corrected when the aperture value is changed according to a change of shooting condition." In other words, in Tamura, the correcting of aperture value information is "a based on a change of shooting condition," and is not "based on the shooting condition" as recited in the present claim 1. Moreover, it is not clear in the first place to a skilled person in the art at the time of the invention as to how to combine the feature "correcting the amount of noise" disclosed in Curtis et al. and the feature "correcting aperture value information" disclosed in Tamura. Accordingly, it is not reasonable in itself that the Examiner leads to the recognition of "smear correction based shooting condition" based on descriptions of Curtis et al. and Tamura.

As mentioned above, none of the references disclose the shooting condition estimating means for "estimating a shooting condition when an image based on said signal is acquired" and the correction means for "correcting the amount of noise estimated by the noise estimating means based on the shooting condition estimated by the shooting condition estimating means" according to the present claim 1. Since Curtis et al. and Tamura do not disclose these features, the hypothetical combination of Curtis et al. and Tamura, as suggested by the Examiner, do not enable a skilled person in the art to easily conceive the invention recited in the present claim 1.

In view of the aforementioned, it is submitted that the invention recited in claim 1 patentably distinguishes over the combination of Curtis et al. and Tamura in the sense of both 35 U.S.C. §102 and 103(a).

Since claim 2, 5, 6, 17 and 18 all depend upon claim 1 or a claim which depends from claim 1, it is submitted that claims 2, 5, 17 and 18 are patentable over Curtis et al. in view of Tamura. Since claim 27 recites the same limitations (in method steps) as claim 1, it is submitted that claim 27 is likewise patentable.

Claims 3 and 15 have been rejected under 35 U.S.C. §103(a) as unpatentable over the combination of Curtis et al. taken with the Tamura and in further view of Prentice et al. (U.S. Patent No. 7,064,785) (hereinafter, "Prentice et al."). This rejection is respectfully traversed.

Prentice et al. is relied upon for teaching calculating parameter means based on a signal value level of signals from circuit 20 (sample frame circuit) and circuit 22 (providing a count of a number of pixel values less than X), the noise amount

calculating means calculating the amount of noise based on the parameters calculated by the parameter calculating means (the Examiner making reference to element 26 in Fig. 1). It is most respectfully submitted that that the Examiner's position is incorrect. Prentice et al. is limited to teaching providing an initial dark current correction signal in circuit 26, shown in Fig. 1, which is described as initially storing a correction value which "can be determined, for example, from a factory calibration (or assumed from experience)." "An initial value of 10, for example, has been found to work reasonably well for a 10 bit digital image signal." (See column 3, lines 57-62 of Prentice et al.)

It is submitted that Prentice et al. is limited to teaching sampling of a frame at 20 (See Fig. 1), counting the number of pixel values less than X at circuit 22 and providing this count to calculation circuit 24 which, as is described at column 3, lines 43-53 of Prentice et al., provides an output of +1 if the count is less than 0.3%, providing an output of -1 if the count is greater than 1.0% and providing a 0 output if the count is between 0.3% and 1.0%. This calculated value adjusts the previous correction at circuit 26 accordingly. In those instances where the assumption of the percentage of dark pixels in an image fails, upper and lower limits are applied by circuit 28 and the adjusted dark current level correction is then subtracted from each pixel at subtraction circuit 16.

Firstly, it is submitted that the teachings lacking in the combination of Curtis et al. taken with Tamura are likewise lacking in Prentice et al. In addition, there is no teaching of providing a noise estimating means which, in addition to providing a noise amount calculating means, as recited in claim 3, there is no teaching of how the calculating means of Prentice et al. may be utilized with a correction means for correcting the amount of noise estimated by the noise

estimating means based on the shooting condition estimated by the shooting condition estimating means, as recited in claim 1 which is the base claim of claim 3. The same is true of claim 15 and it is submitted that claims 3 and 15 are patentable over Curtis et al. taken with Tamura and Prentice et al.

Claims 4 and 16 have been rejected under 35 U.S.C. §103 as unpatentable over Curtis et al. in view of Tamura and in further view of Tadashi Ohta (U.S. Patent No. 7,158,183) (hereinafter, "Ohta"). This rejection is respectfully traversed.

Ohta is limited to teaching both destructive type image sensors and non-destructive type image sensors for utilization in a camera having five (5) small rectangular-shaped areas 902 utilized for spot metering and spot focus detection. Even assuming for the sake of argument that the limitations set forth in claim 4 are sufficiently broad as to read on the spot metering regions 902, since the phrase "regional estimating means" is a broad enough phrase to cover a spot metering region, nevertheless, Ohta is lacking in the same features lacking in both Curtis et al. and Tamura and it is submitted that claims 4 and 16 are patentable over this three-reference combination.

Claims 7 and 19 have been rejected under 35 U.S.C. §103(a) as an unpatentable over Curtis et al. in view of Tamura and further in view of Sugimoto et al. (U.S. Patent No. 7,242,434) (hereinafter, Sugimoto et al.). This rejection is respectfully traversed.

The Examiner admits that the combination of Curtis et al. taken with Tamura **does not** disclose judging, based on exposure information, whether or not the shooting condition relating to an overall signal when an image based on the

signal is acquired is of night view shooting and relies upon Sugimoto et al. for this teaching. It should be noted that Sugimoto et al. is limited to teaching a method for focusing a camera lens in which step 118 determines "whether or not the shooting mode is one of landscape mode and night mode with flash off" and does not use night mode of detection to correct for noise. Sugimoto et al. fails to teach or even remotely suggest determining whether or not the shooting situation relating to the overall signal when an image based on the signal is acquired is of night view shooting, the shooting situation estimating means of claim 7 of the present application being dependent from claim 2 which, in turn, depends from claim 1 wherein the shooting situation estimating means is **utilized by the correction means** for ultimately reducing the noise in the signal by noise reducing means, Sugimoto et al. being limited to use of the night mode for purposes of focusing the lens and not for noise reducing means.

In addition, Sugimoto et al. is lacking in the teachings lacking in Curtis et al. and Tamura and it is submitted that claim 7, as well as claim 19, is patentable over the last-mentioned three-reference combination.

Regarding allowable claims 11-13 and 23-25 it is submitted that the need for amending these claims is not necessary in view of the fact that their base claims, as well as any intervening claims, are submitted to patentably distinguish over the cited art of record.

On a further note, a Japanese patent application (Application No. 2002-242400, Publication No. 2004-88149), corresponding to and having the same claim contents as the present U.S. Patent Application No. 10/646,637, was allowed for novelty and non-obviousness and granted a patent (Japanese Patent No. 3,762,725).

Conclusion

If the Examiner believes that any additional minor formal matters need to be addressed in order to place this application in condition for allowance, or that a telephone interview will help to materially advance the prosecution of this application, the Examiner is invited to contact the undersigned by telephone at the Examiner's convenience.

In view of the foregoing amendment and remarks, Applicant respectfully submits that the present application, including claims 1-7, 11-13, 15-19, 23-25 and 27, is in condition for allowance and a notice to that effect is respectfully requested.

Respectfully submitted,

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